



**OROFACIAL PAIN – CHALLENGES IN DIAGNOSIS & MANAGEMENT:
LITERATURE REVIEW**

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INTRODUCTION

Facial pain may be caused by an underlying disease of facial structures, it may originate from cranial nerves or it may occur without detectable structural lesions [1, 2]. Recurrent or chronic facial pain may be a diagnostic challenge due to overlapping symptoms, complex history, or equivocal findings in the diagnostic workup [3-6]. This is particularly true for a condition known in clinical practice

as “atypical facial pain” and called “persistent idiopathic facial pain” in the second edition of the International Classification of Headache Disorders (ICHD-II).1

The term orofacial pain (OFP) commonly refers to pain associated with the hard and soft tissues of the head, face, oral cavity and neck. The specialty of OFP is the discipline

of dentistry which includes the assessment, diagnosis and treatment of patients with OFP pain disorders, including temporomandibular disorders, oromotor and jaw behavior disorders, neuropathic and neurovascular pain disorders, sleep disorders as they relate to OFP, as well as the pursuit of knowledge of the underlying pathophysiology and mechanisms of these disorders.

It is often considered a link between the medical and dental professions due to the complex nature of presentations found in the OFP patient population. This complexity necessitates that the scope of training for the OFP specialist go well beyond what is normally found in most dental residency programs. Many patients with OFP will also present with numerous medical comorbidities necessitating involvement from a broad variety of other specialties for their care.

An estimated 30-40 % of the population has experienced some form of OFP with the most significant prevalence in the 18- to 25-year-old age group. The pathophysiology of OFP may be due to disease of the orofacial structures, musculoskeletal system disorders, peripheral or central nervous system disorders, systemic maladies, the manifestation of psychosocial disorders, or possibly the sequela of poor sleep.

OFP can be primary in presentation or secondary due to referral from other sources, such as cervical or intracranial structures. Temporomandibular disorders (TMDs), a subclassification of OFP, are the second most common pain presentation in the lower face behind dental and oral mucosal pains and have an estimated prevalence of 3–15 % for Western populations. Many patients who experience OFP also tend to suffer with headache disorders. Due to the complex and shared neuronal mechanism of these disorders, an understanding of OFP will ultimately prove beneficial to the headache clinician

DIFFERENTIAL DIAGNOSIS OF OROFACIAL PAIN

Atypical Odontalgia (AO)

Atypical odontalgia is one of many painful conditions that affect the oral cavity and is often overlooked in the differential diagnosis. Atypical odontalgia (AO) represents a clinical challenge for most dentists [1]. Generally, when a patient complains of pain, its origin is odontogenic, and the professional can identify and treat its cause - for example, a typical toothache due to pulpitis, caries or periodontal problem. But in some situations, pain continues in one or more teeth or in the socket after extraction without any apparent dental cause [2], and the dentist faces the

challenge of determining the true non-odontogenic origin of pain and properly diagnosing it [1, 3-5].

The difficulty in diagnosing AO is because the reported pain is identical to those of odontogenic origin without clinical and radiographic alterations [4, 6]. The patient may have a history of extensive dental treatment without pain relief, which makes the diagnosis more complex [7, 8].

The physiopathology is not well defined. Currently, there is insufficient evidence to establish a treatment protocol for AO [25]. Tricyclic antidepressants, antiepileptics, anesthetics, and botulinum toxin, although reducing the pain of the patient [3, 22, 25], have limited activity and have no proven effectiveness [25-27].

Burning Mouth Syndrome (BMS)

Burning mouth syndrome (BMS) is a chronic disorder characterized by a burning sensation or other dysesthesias and the clinical appearance of the oral mucosa is within normal limits [18, 19]. BMS most commonly affects middle-aged women after menopause; there is an estimated prevalence in this population ranging from 0.7 to 15.0%. The wide variation in prevalence is probably the result of different diagnostic criteria [18, 20]. Subjective complaints, such as dysgeusia and xerostomia with or without the presence of

salivary hypofunction, are also observed [18, 20-23].

Dental pain

Although orofacial pain conditions mimicking dental pain, and vice versa, are rare, the consequences are often severe for both the patient and the clinician [24]. Chronic orofacial pain (COFP) provides a significant burden and remains poorly diagnosed and managed due to the siloed training of professionals in managing conditions in the headache and neck region [25].

Differentiating odontogenic from non-odontogenic pain is particularly challenging. For those mechanistically inclined, there are two types of, “healthy pains,” these are nociceptive and inflammatory pain (infective or post-surgical).

Toothache and dental pain can present in many guises replicating signs and symptoms seen in headaches and other common conditions. Elicited allodynic pain is seen in cracked tooth syndrome and reversible pulpitis in response to touch and cold stimuli (heightened sensitivity of A delta fibers), which can mimic trigeminal neuralgia (TN), post-traumatic neuropathies, trigeminal autonomic cephalalgias (TACs) and other secondary neuropathies. The dull episodic spontaneous intense throbbing pain of

irreversible pulpitis, with sensitivity to heat (hypersensitivity of C fibers) can mimic myofascial pain and migraine. Dental abscess pain with pain on biting can mimic temporomandibular and myofascial pain disorders. It is also acknowledged that acute pain conditions and oral surgery may induce recurrence or re-emergence of existing chronic headaches [26].

Dental vitality tests are notoriously unpredictable, often not resolving the diagnostic dilemma, but adding to it, indicating non-vitality in an unrestored, non-diseased vital tooth often leading the “desperate” patient and clinician to make irrational treatment decisions. What is also counterintuitive for dentists, is that they are familiar with mechanical allodynia and hyperalgesia (pain to non-nociceptive stimuli and increased pain to a painful stimulus) being present in health (dentine sensitivity or cracked tooth) unlike any other bodily tissue. Thus, neuralgic oral pain can be present in health (dentine sensitivity, cracked tooth or exposed pulp) as well in many other pathological conditions (odontogenic infections, salivary obstructive disease, temporomandibular disorders (TMD) dysfunctional disc entrapment, mucosal ulceration, TACs, referred cancer pain, TN, post-herpetic neuralgia and post-traumatic

neuropathy), making the diagnosis of orofacial pain conditions challenging.

Sinusitis

Acute rhinosinusitis can be associated with causing toothache symptoms [27]. It is well recognized by dentists that sinusitis can mimic dental pain. However, up to 88% of people who self-report or have physician diagnosed sinusitis actually have V2 migraine [29, 30]. The episodic and/or continuous fluctuant pain of sinusitis classically worsens on posturing forward and increased barometric pressure. The dull fluctuant ache can present as maxillary molar, premolar, or canine pain, which may also respond to anti-inflammatories and antibiotics. Panoramic radiographs are not reliable in diagnosing antral mucosal pathology or chronic sinusitis. Based upon high level evidence, patients presenting with midfacial chronic pain, with no obvious polypoid or acute sinusitis pathology, should have migraine in the V2 distribution explored. The patient may have a past history of migraine or concomitant migraine with the midfacial symptoms and may be suffering from neurovascular facial pain [29]. Dental pathology extending into the maxillary sinus may also become symptomatic (large dental cysts, periapical abscesses, and neoplastic

lesions) with odontogenic pain symptoms mimicking sinusitis pain.

Sialadenitis

Sialadenitis may cause pain overlying the mandibular region. Due to the nature of obstructive salivary gland disease, it can present as episodic high intensity (neuralgic) pain and may respond to antibiotics. The neuralgic features of “meal time” syndrome are due to an intense pain caused by the attempted salivary discharge from the blocked ducts, which may be caused by salivary calculus, infection, or neoplasia. On examination, discharge and tenderness of the gland and their ducts (Stenson’s duct for the parotid) may confirm that the pain is related to salivary gland disease rather than dental pain.

Giant Cell Arteritis

This inflammatory disease should be suspected in patients over 50 years, presenting with sudden onset persistent headache centered on one or both temples precipitated by cold and accompanied with visual acuity changes or intermittent jaw claudication during attacks. Pain related to giant cell arteritis is generally distributed in the V1 distribution but can radiate to V2 and 3. The pain is intense and excruciating with or without visual signs. The temporal artery affected may be prominent and tender to

palpation. Erythrocyte sedimentation rate and/or C-reactive protein will be significantly elevated in these patients. Urgent referral of the patient is required for assessment and steroid medication to prevent blindness.

Cervicogenic Pain

The potential for cervical spine or muscular problems to cause headache is recognized (ICHD classification of cervicogenic headache), and the pain usually presents within the trigeminal and upper cervical (C2, C3) dermatomes. C2-C3 provide general sensation over the skin at the angle of the mandible [31]. There is also significant neuronal interplay between the trigeminal system and the great and lesser occipital complex which may also complicate pain presentation [32].

Cardiac Heterotrophic Pain

“Toothache pain” of angina origin has been frequently reported [33], and can be bilateral, though mainly reported on the left side [34]. The afferent sympathetic and parasympathetic innervation to the myocardium are likely to be the generators of this heterotopic pain, usually transferred via the first 5 thoracic roots, causing pain in the chest and arms, but not in the face and jaw. For this reason, it is thought that the parasympathetic system has a significant role in causing mandibular pain, via the

trigeminal nucleus [35, 36]. Angina related facial pain is likely to present concomitantly with left arm and chest pain but can arise alone. The pain is likely associated with exertion and alleviated on rest or on using medication for angina. The patient is likely to have known risk factors associated with ischemic heart disease and may or may not be already diagnosed with angina [37]. Referral to the patient's medical practitioner is recommended if suspected.

Oropharyngeal Carcinoma

This is referred to pain presenting as toothache in posterior mandible [39]. We are taught that oral cancer presents painlessly, however, recent studies have highlighted that pain often precedes diagnosis of oral and oropharyngeal carcinoma. Pain is reported to be the initial symptom of oral cancer in 19.2% of 1412 patients [38]. In another study, 12 patients reported severe orofacial pain prior to diagnosis of their recurrent oropharyngeal cancers [39]. With oropharyngeal cancer being 1 of 3 cancers increasing in prevalence (along with melanoma and hepatocellular cancer) and association with HPV and oral sex [40], the clinician must be aware of oropharyngeal cancer presenting as pain mimicking rare orofacial pain conditions, for example, glossopharyngeal neuralgia, preauricular

pain, and jaw pain. If the patient presents with recent onset pain symptoms, with unexplained sensory or motor neuropathy, neoplasia must be first excluded.

Temporomandibular Disorders (TMD)

TMDs can be subcategorized into 3 broad groups, disc displacement (dysfunction, clicking, locking), arthralgia, or myalgia (including arthromyalgia, myogenic, temporalis tendinitis, and myofascial pain) [41]. The most common chronic orofacial pain conditions presenting in the orofacial region are temporomandibular myogenic disorders often present comorbidly with headaches [42, 43]. Both of these conditions can refer pain to the second (maxillary or V2) and third division (mandibular or V3) of the trigeminal nerve mimicking toothache, emphasizing the importance for dental practitioners to understand the possibility of TMD myofascial pain mimicking posterior maxillary and mandibular molar pain [41, 42]. In addition, the C2-C3 dermatome representation continues superiorly behind and above the ear further confusing a diagnosis of TMD. TMD is also associated with comorbid pain conditions particularly headaches and cervical pain [43].

Eagle Syndrome

Eagle syndrome is an uncommon sequela of elongation of the styloid process or

calcification of the stylohyoid ligament. Incidence of elongated styloid process ranges from 4% to 7.3%; however, only 4% of those cases may be actually symptomatic [44]. Patients often have a history of neck trauma (typically tonsillectomy). The abnormal stylohyoid complex is thought to cause symptoms by impinging on cranial nerves V, VII, IX, or X. The symptoms include dysphagia, foreign body sensation in the throat, pain with yawning or turning of the head, and facial pain, often radiating to the mastoid and ear. Styloidectomy is the appropriate treatment.

Glossopharyngeal Neuralgia

Glossopharyngeal neuralgia causes unilateral pain affecting the ear, tongue, tonsillar fossa, and/ or beneath the mandibular angle [45, 46]. Varicella zoster is an uncommon cause of glossopharyngeal neuralgia [47, 48]. Use of local anesthetics in the diagnosis and treatment of glossopharyngeal neuralgia dates back to at least the early 1980s, when cocaine applied to the tonsillar fossa was used in the diagnosis of glossopharyngeal neuralgia [49].

Greater Auricular Neuralgia (GAN)

It has been suggested that the GAN is most superficial, and therefore most vulnerable to iatrogenic injury, as it emerges from the posterior border of the SCM, an area

sometimes referred to as “McKinney’s point.” This is approximately 6.5 cm caudal to the external auditory canal, or about one-third the distance from the external auditory canal to the clavicular origin of the SCM, along the posterior border of the SCM [52, 53]. This is roughly the location recommended for surface stimulation when performing nerve conduction studies of the GAN [50, 54]. This is also likely the best place to attempt a Tinel’s maneuver when evaluating patients for possible GAN neuralgia. Like other types of neuralgia, GAN neuralgia can be either idiopathic or secondary to an underlying aetiology. Patients have secondary GAN neuralgia due to iatrogenic injury, trauma, inflammation, and neoplasm.

A disorder characterized by unilateral brief stabbing pain, abrupt in onset and termination, in the distribution of the great auricular nerve (preauricular, parotid and jaw angle and/or posteroinferior pinna and mastoid). It is commonly provoked by neck rotation and may remit and relapse similar to other craniocervical neuralgias

Diagnostic criteria

- A. Paroxysmal attacks of unilateral pain in the distribution of the great

auricular nerve (GAN)¹ and fulfilling criterion

B. Pain has at least 2 of the following 3 characteristics: 1.

1. Recurring in paroxysmal attacks lasting from a few seconds to minutes.
2. Severe in intensity.
3. Shooting, stabbing or sharp in quality

C. Pain is associated with one of the following:

1. Dysaesthesia and/or allodynia apparent during innocuous stimulation of the innervation area.
2. Precipitation by neck rotation.
3. Prominent tenderness or Tinel's along the lateral neck where the GAN courses the sternocleidomastoid

D. Pain is eased temporarily by local anesthetic block of the affected nerve.

Pain is located in the pre-auricular, parotid and jaw angle (anterior branch) and/or the mastoid and posteroinferior pinna (posterior branch).

Similar to trigeminal neuralgia, GAN neuralgia should be distinguished from GAN neuropathy. GAN neuropathy pain is usually continuous or near-continuous, and

commonly described as a burning, paresthesia, or dysesthesia. While brief paroxysms (neuralgia) may be superimposed, they are not the predominant pain type. GAN neuropathy is accompanied by reduced or absent sensation somewhere within the distribution of the GAN. This sensory deficit does not have to include the entire sensory dermatome.

GAN neuralgia should be considered in the differential for paroxysmal stabbing periauricular pain, especially in a patient who can provoke the pain by turning the head or touching the lateral neck or pinna.

Disorders to help clinicians differentiate this entity from GAN neuropathy, other cranial neuralgias and alternate etiologies of periauricular pain, including head and neck pathology. Like other craniocervical neuralgias, GAN neuralgia may be idiopathic or secondary to underlying pathology. If a patient presents with GAN neuralgia concurrent with GAN neuropathy, this should increase clinical suspicion for a secondary etiology. If there is no known history of iatrogenic injury, or if the neuralgic and neuropathic symptoms are disproportionate to what is expected, inflammatory or neoplastic etiologies should be considered. For pain management,

consideration should be given to GAN blocks or stimulators, as these appear to offer greatest benefit for patients in these cases.

Zygomatofacial Neuralgia

Zygomatofacial neuralgia has to be differentiated from other causes of periorbital or facial pain [55]. Unlike trigeminal V2-neuralgia, the pain is not a paroxysmal excruciating pain lasting seconds, nor triggered by innocuous stimuli. The well-limited location within the territory of the zygomatofacial nerve is clearly different from the more diffuse distribution of V2-neuralgia. The detailed boundaries of the affected area and their correspondence to the zygomatofacial innervation territory helps to exclude persistent idiopathic facial pain. The absolute response to the anesthetic block of the zygomatofacial nerve helped to rule out all these conditions and other causes of facial pain.

Infraorbital neuralgia

Infraorbital neuralgia is a rare cause of facial pain and frequently manifests as continuous pain.1 Infraorbital neuralgia may be caused by trauma (a fracture of the orbital rim), maxillary sinusitis, an operation to the maxillary sinus, tumors of the nerve, herpes zoster or other viral infection and unknown causes [56-58].

The main symptom of infraorbital neuralgia is usually unilateral pain in the cheek, upper teeth, and upper jaw. The pain characteristic is sharp, shooting, and tingling. Areas of the face may become very sensitive to touch and when severe, disabling. The patient experiences paroxysmal or constant discomfort, often in the form of stabbing pain, in the distribution area of the infraorbital nerve. The sensation is associated with hyper-sensitivity to palpation in the infraorbital notch [56, 57].

The diagnosis can be made on the basis of the pain location to the external nose and the recognition of the extensive nervous system supply to the nose, the nature of the complaints, and by ruling out other possible secondary causes such as traumatic episodes, neoplasms, and inflammation of the maxillary sinus [56-58].

Infraorbital neuralgia can be classified as having International Headache Society defined as other terminal branch neuralgias which contains neuralgias of infraorbital, lingual, alveolar and mental nerves, but this diagnosis provides little insight into the pathogenesis of the condition [59].

Infraorbital neuralgia is clinically characterized by the following triad:

A. Pain in the distribution of a peripheral branch of the trigeminal nerve;

B. Tenderness over the affected nerve;

C. Pain is abolished by local anesthetic blockade or ablation of the nerve [59].

The most common disorders involved in the differential diagnosis include bursts of headaches, dental pain, giant cell arteritis, glossopharyngeal nerve neuralgia, intracranial tumor, migraine, multiple sclerosis, otitis media, paroxysmal hemicrania, postherpetic neuralgia, sinusitis, SUNCT headache, and temporomandibular joint syndrome [60].

Infraorbital neuralgia may be refractory to medical treatment, which generally includes analgesic, anti-inflammatory, antiepileptic, or antidepressant drugs. Nerve block is among the essential diagnostic criteria for these neuralgias, and it may, therefore, be suggested as a first therapeutic step [56]. Other alternative therapy includes electrical transdermal nerve stimulation in extremely resistant cases [56].

DISCUSSION

- Importance of medical history: patient assessment should begin with its medical history, especially with regard to pain characteristic
- Importance of the clinical examination: the odontogenic causes of toothache must be totally ruled out. For this, a thorough clinical

examination is necessary. One should not forget Rees and Harris's observations emphasizing that all possibilities of caries, pulp disease and crack/fracture of the crown or root should be excluded;

- Complementary imaging tests: despite the limitations of periapical radiographs they should be used to assess the periapical region. Volumetric computed tomography should be performed to rule out any possibility of periapical endodontic alteration. The use of magnetic resonance imaging (MRI), in cases of suspected non-inflammatory dental pain, can be of great value as it excludes inflammation processes in the mandibular and maxillary region. When the diagnosis is uncertain, MRI reinforces the importance of noninvasive management;
- In order to facilitate and assist the diagnostic process, two tools should be highlighted:
 - a) Visual analog scale: diagnostic tool for pain measurement;
 - b) QST and QualST: QualST detects hypersensitivity

disorders to touch, cold, and bristle stimulation.

- Exclude all hypotheses of non-odontogenicodontalgia.
- Refer the patient to other specialists
- Consider psychological aspects: multifactorial etiology. Thus, a biopsychosocial and interdisciplinary approach are necessary.
- Holistic, psychosocial, and not purely mechanical approach is important. It is recommended to listen carefully to the patient's complaint and his/her history of treatments;
- Knowledge and training by professionals are important to avoid unnecessary and iatrogenic procedures.

CONCLUSION

Orofacial pain management can be challenging and the clinician should be aware of the different etiologies and characteristics of the diverse disorders of the orofacial region.

The orofacial pain specialist has the experience and the knowledge to provide a correct diagnosis and management of these conditions.

A multidisciplinary approach is ideal in the management of orofacial pain disorders.

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